

Amendments to the specification

On page 5, replace the paragraph in lines 1-4 with the following new paragraph:

In another aspect, the invention includes machine-readable storage medium embodying computer-readable code which is operable, when used to control code that controls the operation of an electronic computer, to carry out the steps in the above method for assaying or monitoring the extent of joint or bone deformity in a joint-degenerative or joint-damaging disease.

On page 5, replace the paragraph in lines 5-14 with the following new paragraph:

Also disclosed is an automated system for use in assaying or monitoring the extent of joint or bone deformity in a joint-degenerative or joint-damaging disease, such as arthritis or osteoporosis. The system includes an electronic computer, and machine-readable storage medium embodying computer-readable code which is operable, when used to control code that controls the operation of the computer, to carry out the steps in the above method, where the selecting step in the method includes matching contour coordinates for a selected patient phalange with one or more of a plurality of normal-phalange templates from a library of templates. The system also includes a library of normal-phalange templates that is accessible by the code for use in carrying out the selecting step in the method. The library forms yet another aspect of the invention.

On page 6, replace the paragraph in lines 23-29 with the following new paragraph:

As described above, the invention includes an automated method for monitoring or assessing the extent of joint or bone deformity in a joint-degenerative or joint-damaging disease, such as arthritis or osteoporosis or deformity joint disease such as rheumatoid arthritis, and a system and machine-readable code, for

carrying out, or assisting medical personnel in carrying out the method. The code is in the form of a machine-readable storage medium embodying computer-executable code which is operable to control an electronic computer. as will be readily understood from the description of the operation of the code herein. The method will be illustrated with respect to four general embodiments:

On page 8, replace the paragraph in lines 5-12 with the following new paragraph:

The x-ray image is digitized, according to known methods, such as disclosed in the '745 patent, for example, at column 10, lines 21-27, yielding, for example, a 12-bit grey scale image with a resolution of at least 230 dpi. A segmentation and processing module (also forming part of the machine-readable storage medium embodying computer-readable code of the present invention), such as described in the above '745 patent, column 12, line 47 to column 13, line 23, and in related passages describing processing steps 160, 164, 168, 174, 178, and 184) then carries out the following image processing steps:

On page 9, replace the paragraph in lines 17-24 with the following new paragraph:

Figs. 2A and 2B show a flow diagram of steps performed by the machine-readable storage medium embodying computer-readable code of the invention, in carrying out the method of Embodiment 1. As indicated by box 34 in the figure, the coordinates that are determined from the x-ray images are the coordinates at the left and right edges of the bone at its narrowest width (Min), and the apical coordinates corresponding to coordinates at the ends of a line through the widest portion of the phalange (Max) adjacent one or both joints of that phalange, for example, the greatest widths at the top and bottom joint regions of the middle flange.

On page 31, replace the Abstract with the following new paragraph:

A method, machine-readable storage medium embodying computer-readable code and automated system for assaying or monitoring the extent of joint or bone deformity reported by a summarized score that may include joint space narrowing, bone erosion and periarticular osteoporosis in a joint-degenerative or joint-damaging disease in a subject are disclosed. From a digitized image of one of the subject's straight bone terminated with a joint such as fingers, coordinates of right and left bone contours of a selected middle or proximal phalange are determined, and these coordinates are in turn used to determine the coordinates of a minimum width in the middle region of the phalange and one or more apices in a region adjacent at least one side of a joint of the selected phalange. These latter coordinates are used in selecting a reference joint contour representing normal-bone contour for that phalange, or the contour of the patient phalange from an earlier x-ray image. Guided by the reference joint contour, a region of the selected joint of the patient is analyzed to assay or monitor the extent of joint or bone deformity in the subject.